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SCHOOL OF PHYSICAL AND MATHEMATICAL SCIENCES

DEPARTMENT OF GEOSCIENCES
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Quarterly Progress Report

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Investigation Title: Utilization of EREP Data in Geological Evaluation, Regional Planning, Forest Management, and Water Management in North Carolina

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During the quarter March to May, 1974, imagery has been enlarged and study begun on four areas of North Carolina: Asheville, Greensboro - Winston-Salem, Raleigh, and the coastal region adjacent to Albemarle Sound.

Asheville

The Asheville study has the cooperation of the Metropolitan Planning Commission of Asheville-Buncombe County and the Office of Earth Resources. In this study the possible use of SKYLAB imagery for updating very detailed land-use maps is being investigated. After preliminary land-use mapping with the SKYLAB imagery, using the Anderson, Hardy, Roach classification (U.S.G.S. Circular 671), we discussed the needs of the planners in the Asheville-Buncombe County area and

modified the mapping units to fit the classification they are using. The investigation is continuing along these lines. Cloud cover limits the usefulness of the imagery, restricting the areas that can be observed.

From the Asheville study we have learned that for this mountain setting major residential areas may be mapped, scattered concentrations of housing in rural areas may be mapped, and that in some areas it is possible to count individual houses with considerable accuracy. It has been suggested that it may be possible, locally in any case, to estimate populations from the house count data. The techniques necessary of this use are beyond the scope of this investigation.

Within the pockets of development outside urbanized areas it seems possible to obtain an accounting of the houses and other major structures present, although specific identifications cannot probably be made with consistency. By way of comparison, ERTS-1 imagery defines in a general way the developed areas with fair accuracy, but it is difficult to classify the developed areas in terms suitable for use by the local planners. SKYLAB information comes closer to meeting the needs of the planners in terms of resolution and interpretability of the data. In the Asheville-Buncombe County area we are dealing with a planning effort that might be said to be mature.

SKYLAB does not appear to show the geological features of the mountains of Western North Carolina as well as ERTS-1. Lineaments are difficult to recognize, although the major structures of the adjacent folded Appalachians in Tennessee are easily recognizable, as on all imagery.

Small water bodies which are only marginally discernable on the ERTS-1 imagery can be positively identified by projecting the infrared bands of SKYLAB S190A photography to a scale of 1:17,000. Most of the lakes so identified were about 1.5 to 2 acres in area.

It is impossible to identify uniquely on the basis of spectral response industrial areas and to separate them from commerical areas (e.g., large shopping centers). The context within which the feature sites must be used as a guide to its identification.

In the mountain setting we have tried to separate cropland from orchards without success.

Greensboro

Again cloud cover limits the usefulness of the imagery for general regional studies. Local studies are possible, however, and these are being pursued.

One use to which the imagery will be placed is in a site evaluation for a proposed new state park between Greensboro and Winston-Salem. The imagery shows well the development that is encroaching into the general area of the proposed site and some of the variations in vegetative cover. This study is just getting underway.

Raleigh

Imagery taken during the September 1973 overflights of the piedmont region is to be evaluated in terms of planning needs for Region J and for Wake County. Preliminary evaluation of the imagery shows that locally it can be nearly as

useful for some purposes as U-2 imagery. Street patterns in Durham and Raleigh stand out well, even in the more heavily wooded areas of northwest Raleigh. The street patterns in a moderately large housing development presently in a construction phase are readily recognizable. Open areas between partially completed and completed houses can be separated from the buildings.

Major power transmission lines are recognizable, and the individual towers supporting the lines can be identified.

Coastal Region

In the coastal region a study of Oregon Inlet has revealed the existence of unmapped channels in the flood delta. The channel may have a significant influences on the hydrodynamics of the inlet and upon maintenance problems. Data from research currently underway in the Department of Geosciences will be examined in the future to see if the imagery can be of assistance in its interpretation.

SKYLAB imagery of the region bordering Albemarle Sound has been made available to a planner in the Region R planning office. He will examine the imagery and provide groundtruth information about an area of interest to him. Again cloud cover limits the usefulness of the imagery.

The imagery of the Chowan River is mostly cloud-covered and of limited usefulness; however, some water quality investigations may be possible in parts of Albemarle Sound. Variations expressed faintly in the imagery seem to be present. The aerial photography flown in conjunction with the SKYLAB pass of August 9, 1973, does not show any notable water quality differences, except those assoicated with

suspended sediment at points along the northern shore of Albermarle Sound. Again cloud cover limits the usefulness of the photography.

Funding appears to be adequate to carry the contract to its present projected completion date of December 31, 1974, although there may have to be some shifting of money within the various budget items.